March 7, 1997

Mr. C. Randy Hutchinson
Vice President, Operations ANO
Entergy Operations, Inc.
1448 S. R. 333
Russellville, AR 72801

SUBJECT: ISSUANCE OF AMENDMENT NO. 180 TO FACILITY OPERATING LICENSE NO. NPF-6 - ARKANSAS NUCLEAR ONE, UNIT NO. 2 (TAC NO. M77399)

Dear Mr. Hutchinson:

The Commission has issued the enclosed Amendment No. 180 to Facility Operating License No. NPF-6 for the Arkansas Nuclear One, Unit No. 2 (ANO-2). This amendment consists of changes to the Technical Specifications (TSs) in response to your application dated April 11, 1996 as supplemented by letters dated June 18, and September 5, 1996.

The amendment adds low-temperature overpressure protection requirements to the TSs as proposed by Generic Letter 90-06.

A copy of our related Safety Evaluation is also enclosed. A Notice of Issuance will be included in the Commission's next biweekly Federal Register notice.

Sincerely,

ORIGINAL SIGNED BY:
George Kalman, Senior Project Manager
Project Directorate IV-1
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Docket No. 50-368

Enclosures: 1. Amendment No.180 to NPF-6
2. Safety Evaluation

cc w/encls: See next page

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

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cc w/encls: See next page

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

ENTERGY OPERATIONS, INC.

DOCKET NO. 50-368

ARKANSAS NUCLEAR ONE, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 180
License No. NPF-6

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Entergy Operations, Inc. (the licensee) dated April 11, 1996 as supplemented by letters dated June 18, and September 5, 1996, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance: (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this license amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and Paragraph 2.C.(2) of Facility Operating License No. NPF-6 is hereby amended to read as follows:

   2. Technical Specifications

      The Technical Specifications contained in Appendix A, as revised through Amendment No. 180, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. The license amendment is effective within 30 days of its date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

George Kalman

George Kalman, Senior Project Manager
Project Directorate IV-1
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: March 7, 1997

ATTACHMENT TO LICENSE AMENDMENT NO. 180

FACILITY OPERATING LICENSE NO. NPF-6

DOCKET NO. 50-368

Revise the following pages of the Appendix "A" Technical Specifications with the attached pages. The revised pages are identified by Amendment number and contain vertical lines indicating the area of change.

REMOVE PAGES	INSERT PAGES
--	3/4 4-28
--	3/4 4-29
--	B 3/4 4-12

REACTOR COOLANT SYSTEM

OVERPRESSURE PROTECTION

LIMITING CONDITION FOR OPERATION

3.4.12 Low temperature overpressure protection (LTOP) shall be OPERABLE with each SIT isolated*, and:

a. Two LTOP relief valves with a lift setting of ≤430 psig, or

b. The Reactor Coolant System depressurized with an RCS vent path ≥6.38 square inches,

* SIT isolation is only required when SIT pressure is greater than or equal to RCS pressure.

APPLICABILITY: MODE 4 with T_C ≤220°F, MODE 5, MODE 6 with reactor vessel head in place.

ACTION:

a. With one LTOP relief valve inoperable in MODE 4, restore the inoperable valve to OPERABLE status within 7 days or depressurize and vent the RCS through a ≥6.38 square inch vent path within the next 8 hours.

b. With one LTOP relief valve inoperable in MODE 5 or 6, either (1) restore the inoperable relief valve to OPERABLE status within 24 hours, or (2) complete depressurization and venting of the RCS through a ≥6.38 square inch vent path within a total of 32 hours.

c. With both LTOP relief valves inoperable, depressurize and vent the RCS through a ≥6.38 square inch vent path within 8 hours.

d. With a SIT not isolated, isolate the affected SIT within 1 hour. If required action is not met, either:
(1) Depressurize the SIT to less than the RCS pressure within 12 hours, or
(2) Increase cold leg temperature to greater than or equal to 220°F within 12 hours.

e. The provisions of Specification 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.4.12.1 Verify both sets of LTOP relief valve isolation valves are open at least once per 72 hours when the LTOP relief valves are being used for overpressure protection.

4.4.12.2 The RCS vent path shall be verified to be open at least once per 12 hours** when the vent path is being used for overpressure protection.

4.4.12.3 Verify that each SIT is isolated, when required, once every 12 hours.

4.4.12.4 No additional LTOP relief valve Surveillance Requirements other than those required by Specification 4.0.5.

** Except when the vent path is provided with a valve which is locked, sealed, or otherwise secured in the open position, then verify this valve is open at least once per 31 days.

3/4.4.12 LOW TEMPERATURE OVERPRESSURE PROTECTION SYSTEMS

Low temperature overpressure protection (LTOP) of the RCS, including the reactor vessel, is provided by redundant relief valves on the pressurizer which discharge from a single discharge header. Each LTOP relief valve is a direct action, spring-loaded relief valve, with orifice area of 6.38 in^2 and a lift setting of ≤430 psig, and is capable of mitigating the worst-case design basis pressurization event. The LTOP design basis event is a simultaneous injection of two HPSI pumps and all three charging pumps to the water-solid RCS. The analyses assume that the safety injection tanks are either isolated or are depressurized.

The LTOP system, in combination with the RCS heatup and cooldown limitations of LCO 3.4.9.1 and administrative restrictions on RCP operation, provides assurance that the reactor vessel non-ductile fracture limits are not exceeded during the design basis event at low RCS temperatures. These non-ductile fracture limits are identified as LTOP pressure-temperature (P-T) limits, which were specifically developed to provide a basis for the LTOP system. These LTOP P-T limits, along with the LTOP enable temperature, were developed using guidance provided in ASME Code Section XI, Division 1, Code Case N-514 that mandates that "LTOP systems shall limit the maximum pressure in the vessel to 110% of the pressure determined to satisfy Appendix G, paragraph G-2215 of Section XI, Division 1".

The enable temperature of the LTOP isolation valves is based on any RCS cold leg temperature reaching 220°F (including a 20°F uncertainty). Although each relief valve is capable of mitigating the design basis LTOP event, both valves are required to be opened below the enable temperature to meet the single failure criterion of NRC Branch Technical Position RSB 5-2, unless an RCS vent path of 6.38 in^2 (equivalent relief valve orifice area) or larger is maintained.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO.180 TO

FACILITY OPERATING LICENSE NO. NPF-6

ENTERGY OPERATIONS, INC.

ARKANSAS NUCLEAR ONE, UNIT NO. 2

DOCKET NO. 50-368

1.0 INTRODUCTION

By letter dated April 11, 1996 (Ref. 1), as supplemented by letters dated September 5, (Ref. 2) and June 18, 1996 (Ref. 3), Entergy Operations, Inc. (EOI) (the licensee) submitted a request for changes to the Arkansas Nuclear One, Unit No. 2 (ANO-2) Technical Specifications (TSs). The requested changes would add low temperature overpressure protection requirements to the TSs in accordance with recommendations contained in Generic Letter (GL) 90-06.

The supplements dated September 5, and June 18, 1996, provided additional information and modified the TSs slightly, but did not change the initial proposed no significant hazards consideration determination.

On June 18, 1991, EOI proposed modified TSs to satisfy the GL 90-06 requirements. However, the relief valve setpoints were based on the topical report CEN-381-P. On June 14, 1995, the Nuclear Regulatory Commission (NRC) notified EOI that the CEN-381-P methodology was not acceptable. EOI committed in a letter dated December 5, 1995, to submit a revised TSs request by April 15, 1996. Reference 1 fulfilled that commitment. In the TS revision, EOI proposes to use the ASME Code Case N-514 as the basis for the low-temperature overpressure protection (LTOP) operating conditions. On January 28, 1997, NRC issued an exemption from the requirements of 10 CFR 50.60 which authorized the use of Code Case N-514 at ANO-2.

The ANO-2 LTOP system consists of a single discharge header from the pressurizer which feeds two redundant pressure relief valves each with an upstream motor operated isolation block valve. The relief valves are operator aligned to the RCS during cooldown by opening the isolation valves and conversely are isolated during heatup by closing the isolation block valves. The LTOP isolation valves provide the reactor coolant system (RCS) boundary in operating modes 1, 2 and 3. The design basis LTOP event is a safety injection of two high pressure injection pumps and all three charging pumps to a water solid RCS. Each LTOP relief valve provides a minimum of 6.38 in^2 opening which has the capacity to relieve the design basis event. To address the TS requirements of GL 90-06 for ANO-2, the transient pressure-temperature (PT) limits were reevaluated using the methodology of the Code Case 514 (ASME Section XI). The new limits are less restrictive than those estimated using Appendix G of ASME Section XI because the maximum vessel pressure for Code Case 514 is 110% of the pressure satisfying the Appendix G requirements.

2.0 EVALUATION

2.1 Inputs and Assumptions

The relief valve setting is 430 psig (445 psia), and the valves are aligned to the RCS during cooldown and isolated from the RCS during heatup. An alarm will notify the operator if the temperature drops below the enable temperature during cooldown and the isolation valves are not fully open. The relief valve with the pressure setting, the enable temperatures and temperature settings and the revised PT curves settings combined with the revised PT curves comprise the LTOP system.

In the revised LTOP system new pressure correction factors are associated with Code Case N-514. In addition, administrative reactor coolant pump operation limitations are imposed as follows: no pumps operating below 120 °F, two pumps between 120 °F and 200 °F and three pumps could operate above 200 °F. The temperatures represent actual cold leg temperatures without instrument uncertainty correction. Conservative pressurizer pressure and temperature instrument uncertainties of -85 psi and 20 °F respectively were assumed. The pressurizer was assumed to be water solid at the lowest RCS temperature of 50 °F.

The PT limits are based on the existing temperature change rates and instrument corrections for pressure and temperature. The enable temperature was based on the existing analysis for the adjusted reference temperature at one-quarter thickness for 21 effective full power years (EFPYs) of operation. The relief valve opening model was an improvement on the original model with information provided by the manufacturer. The indicated enable temperature is 220 °F (200 °F actual cold leg temperature +20 °F instrument uncertainty) for both heatup and cooldown.

The above assumptions used are acceptable because they are conservative and include accepted practice to account for pressure and temperature instrument error. While one valve (6.38 in^2) is credited for depressurization both valves are enabled to meet the single failure criterion of Branch Technical Position RSB 5-2.

The assumption of the 1/4T fluence at 21 EFPYs is conservative for several reasons: (1) the original fluence value was determined using the second cycle high leakage fluence rate while the plant has been refueled with low leakage loadings since the sixth cycle (currently is the 12th cycle) (2) the value for 21 EFPYs will be used only to the next refueling when the plant will have experienced less than 13 EFPYs and (3) in recent cycles the inlet temperature at ANO-2 was lowered, thus, the density of the water in the downcomer increased. These conservatisms more than compensate for the fact that the original fluence was estimated using the ENDF/B-IV cross sections. ANO-2 does not have a thermal shield; thus, the cross section change if ENDF/B-VI values were used would not affect the inner vessel surface flux by any significant amount. Therefore, the overall effect is that the conservatisms are significantly higher than the non-conservatism of the cross sections.

Per GL 92-01, the licensee will reevaluate the inner wall vessel fluence and submit the results in early 1997 (Ref. 2). This reevaluation will include the effect of the ENDF/B-VI cross sections and vessel chemistry and will include an estimate of the remaining EFPY operating margin and the next surveillance capsule removal schedule.

For the above reasons we find the proposed analysis model acceptable.

2.2 Results

The enable temperatures for heatup and cooldown are 220 °F, where 200 °F is the actual cold leg temperature increased by 20 °F for instrument uncertainty. The heatup and cooldown PT curve data are shown in Tables 2 and 3 and Figures 2 and 3 respectively in Ref. 1. The calculated peak transient pressure from the design basis event with one LTOP relief valve operable is 517.7 psia. The corresponding RCS pressure is 526.6 psia. At this pressure the flow rate input from the two high pressure safety injection pumps and three charging pumps is 1532 gpm. The corresponding flow from a single relief valve is 1565 gpm which indicates that the valve capacity exceeds the mass input. The discharge will take place at a lower pressure than 517.7 psia which represents a conservative value for the pressurizer peak transient pressure. The pressure temperature limits indicate that the maximum pressure is conservative.

3.0 Proposed Technical Specifications

The proposed TSs correspond to those in Enclosure B of GL 90-06 which is appropriate for a Combustion Engineering designed plant. There are two changes: (1) the safety injection tank (SIT) must be isolated with the LTOP operable and the SIT pressure higher than the RCS pressure and (2) the proposed ANO-2 TSs do not include action (e) of Enclosure B which requires that a special report be filed whenever the LTOP vents are used to mitigate a transient. The first deviation is acceptable because it accommodates the presence of a pressurized SIT. Regarding the second deviation; the licensee developed administrative requirements for reporting LTOP relief valve actuations on the same basis as the Improved Standard Technical Specifications (ISTS) require the reporting of pressurizer safety valve and pressurizer relief valve actuations.

ISTS require annotation in the monthly operating report whenever the pressurizer relief valve is actuated. The GL 90-06 reporting requirement consists of a special report within 30 days following an LTOP relief valve actuation. Either reporting method provides timely notification to the cognizant NRC technical branch if the LTOP pressure relief vent is actuated. The reporting requirement proposed by the licensee is similar to reporting requirements at other plants, meets the intent of GL 90-06, and is therefore acceptable.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Arkansas State official was notified of the proposed issuance of the amendment. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes surveillance requirements. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (61 FR 20846). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

7.0 REFERENCES

1. Letter J. W. Yelverton, Entergy Operations Inc. to US NRC "Proposed Technical Specification Change Request for Exemption to 10 CFR 50.60 for ASME Code Case N-514" April 11, 1996.

2. Letter from J. W. Yelverton, Entergy Operations Inc. to US NRC "Additional Information on ANO-2 LTOP for Fluence Considerations" September 5, 1996.

3. Letter from J. W. Yelverton, Entergy Operations Inc. to US NRC "Supplemental Change Regarding ANO-2 Proposed Technical Specification On Low Temperature Overpressure Protection" June 18, 1996.

Principal Contributor: Lambros Lois

Date: March 7, 1997